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MCDERMOTT WILL & EMERY LLP
600 13TH STREET, N.W.
WASHINGTON, DC 20005-3096

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RUDE, TIMOTHY L	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/588,478
Filing Date: June 07, 2000
Appellant(s): MORII, YASUHIRO

Scott D. Paul
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 29 March 2005.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement that Applicant is unaware of any related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant notes that independent claims 15 and 16 stand or fall together with independent claim 15 being representative.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,852,485	Shimada et al	12-1998
3,866,313	Yih	02-1975
6,509,948	Suzuki	01-2003
6,441,880	Utsumi et al	08-2002
6,266,121	Shigeta et al	07-2001

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

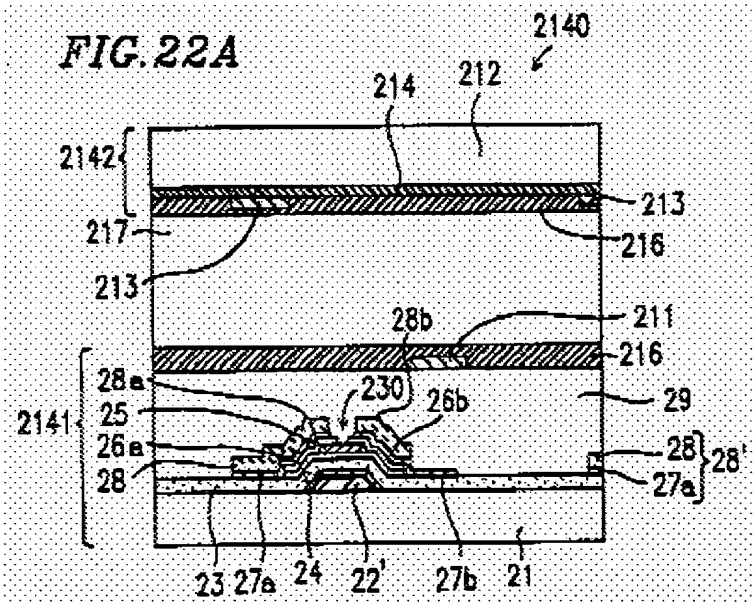
Claims 15 and 16 rejected twice under 35 U.S.C. 103(a). These rejections are set forth in a prior Office Action, mailed on 05 October 2004:

First Grounds of Rejection:

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al (Shimada) USPAT 5,852,485 in view of Yih USPAT 3,866,313, Suzuki USPAT 6,509,948 B2, Utsumi et al (Utsumi) USPAT 6,441,880 B1, and Shigeta et al (Shigeta) USPAT 6,266,121 B1.

As to claims 15 and 16, the structural limitations in these process claims only have patentable weight when they have a non-obvious impact on the process steps, which in general, can be used to make any of a large number of LCD devices with alternate structures. Shimada discloses in Figures 21, 22A, and 22B, the process of

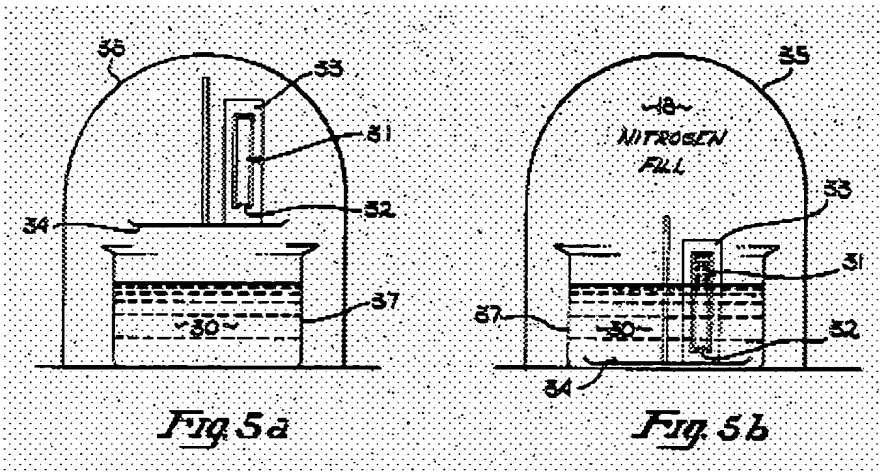
fabricating a liquid-crystal display (LCD) device (in-plane switching-type or conventional type) which comprises; the fabrication of LCD substrate assemblies prior to filling with liquid crystal (Example 12, col. 31, line 66 through col. 36, line 6), comprising: a step of forming a first, substrate, 21, having plural electrodes that include a source line (Applicant's scanning signal line), 28', a Gate line (Applicant's image signal line), 22, a pixel electrode, 211, and an alignment layer, 216, all formed thereon, and a second substrate, 212, having a color filter, 214, a counter electrode also serving as a black matrix (Applicant's light-shielding film), 213, and an alignment layer, 216 all formed thereon.



Shimada does not explicitly disclose forming a sealant between the two substrates and around the outer peripheries of the substrates in such a manner that it partly reaches the edges of the substrates to form an opening through which liquid crystal is to be injected into the space between the sealed substrates, and a step of setting the panel in a liquid crystal-injecting unit having therein a container filled with

liquid crystal, evacuating both the liquid crystal-injecting unit and the panel, putting the opening of the panel into the liquid crystal in the container, thereafter restoring the liquid crystal-injecting unit to have an atmospheric pressure in that condition so that the liquid crystal is injected into the panel through its opening owing to the inner pressure difference between the unit and the panel, and finally sealing the opening of the panel in such a condition that the panel receives no external pressure.

Yih teaches in Figures 1-6 the steps of adhesive application, evacuation, filling, sealing, etc. (Figures 1-5b, and col. 2, line 41 through col. 4 line 52) comprising forming a sealant between the two substrates (col. 3, lines 20-35) and around the outer peripheries of the substrates in such a manner that it partly reaches the edges of the substrates to form an opening (col. 3, lines 23-28) through which liquid crystal is to be injected into the space between the sealed substrates, and a step of setting the panel in a liquid crystal-injecting unit (col. 4, lines 10-17) having therein a container filled with liquid crystal, evacuating both the liquid crystal-injecting unit and the panel, putting the opening of the panel into the liquid crystal in the container (col. 5, lines 26-31), thereafter restoring the liquid crystal-injecting unit to have an atmospheric pressure (col. 4, lines 13-19 and col. 5, line 32 through col. 6, line 5) in that condition so that the liquid crystal is injected into the panel through its opening owing to the inner pressure difference between the unit and the panel (col. 4, lines 15-17), and finally sealing the opening of the panel in such a condition that the panel receives no external pressure (col. 4, line 19) to complete LCD assembly without bubble formation.



Yih teaches forcing the liquid crystal into the LCD assembly by replacing the partial vacuum with a non-reacting gas (therefore at atmospheric pressure) (col. 6, lines 1-3). Yih teaches sealing after removal from the vacuum which would result in the panel receiving no external pressure (col. 4, lines 18 and 19), and Yih teaches sealing *after* removal of the LCD device from the liquid crystal material after filling (col. 6, lines 14-21), and that could not be accomplished without introducing a bubble (avoided by the process of Yih) if the inner pressure were any lower than atmospheric pressure, especially by as much as 0.3 kgf/cm^2.

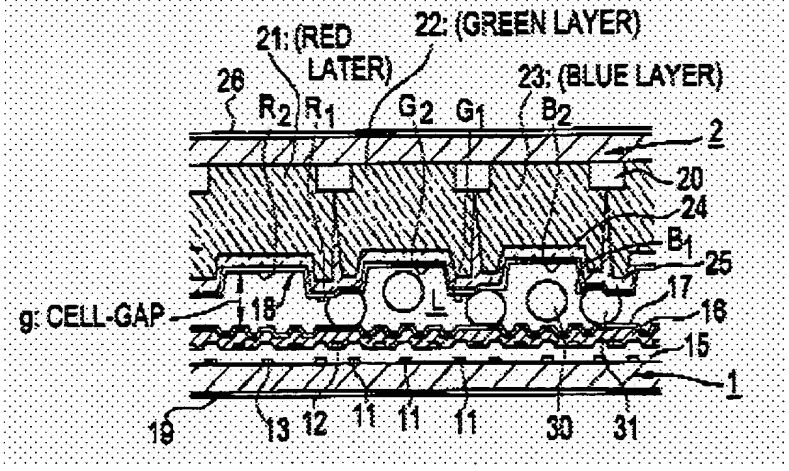
Yih is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use the adhesive application and fill techniques of Yih to complete LCD assembly with an internal pressure that is substantially equal to atmospheric pressure (within 0.3 Kgf/cm^2) to avoid bubble formation.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD fabrication process of Shimada with the sealing and filling process steps of Yih to avoid bubble formation.

Shimada does not explicitly disclose defining a gap between the first and second substrate by disposing a spacer, which is smaller than said gap, on a projecting pattern.

Suzuki teaches in Figures 2A and 2B defining a gap between the first and second substrate by disposing a spacer, 31, which is smaller than said gap, on a projecting pattern at a position corresponding to the shading membrane, 20, on one face of the second substrate where spacers, 30, remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided (Abstract).

FIG. 2B



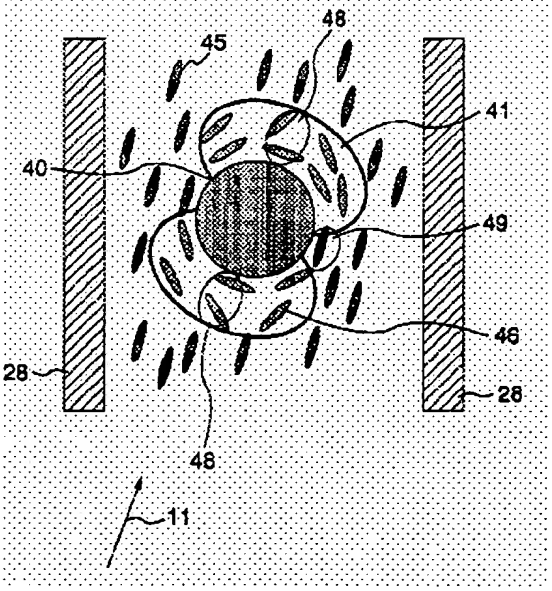
Suzuki is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to define a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada by defining a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern of Suzuki where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Shimada does not explicitly disclose a long-chain alkyl group (functional group) on the surface of the spacers.

Utsumi teaches in Figures 1, 2, and 9, the use of long-chain alkyl group coated spacers (col. 10, lines 8-11) to improve contrast and viewing angle (col. 5, lines 36-40, col. 9 and Abstract).

FIG.2



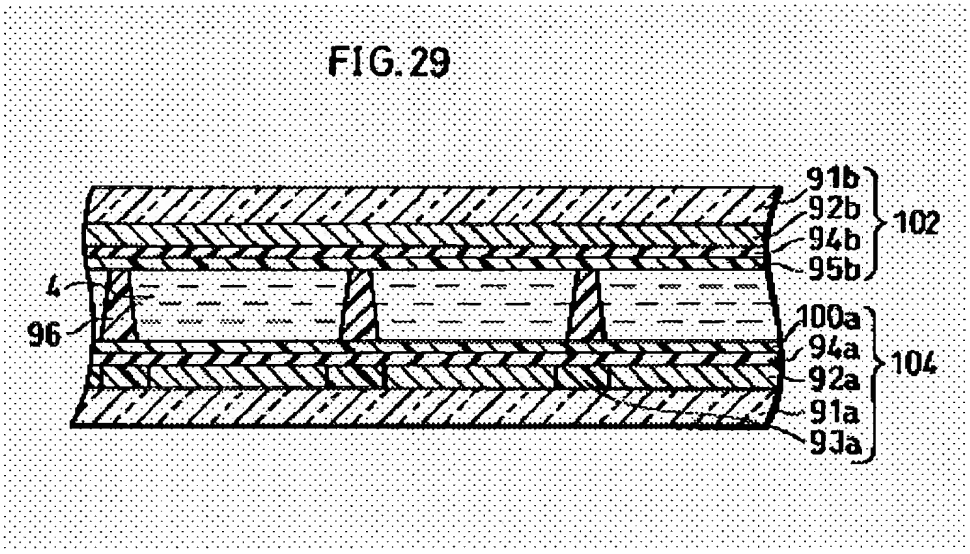
Utsumi is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add the use of long-chain alkyl group coated spacers to improve contrast and viewing angle.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada with the of long-chain alkyl group coated spacers of Utsumi to improve contrast and viewing angle.

Shimada does not explicitly disclose the step of binging said spacer into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding.

Shigeta teaches in Figure 29 the use of spacers such that, because the imidization ratio of the alignment layer 100a (Applicant's orientation controlling membrane) baked at a temperature of 200.degree. C. is substantially 50 per cent, the hydroxy group and the hydrogen group remain in the compound, and the alignment layers 100a and 95b are bonded with each other via the spacer 96 by the hydrogen bonding. Also, since the spacer 96 is made of acrylic resin, and therefore is adhesive, the substrate 102 and the substrate 104 are strongly bonded with each other, thereby realizing a liquid crystal display element having a uniform cell thickness, high shock resistance, and a desirable displaying quality (col. 61, lines 51-61).

FIG. 29



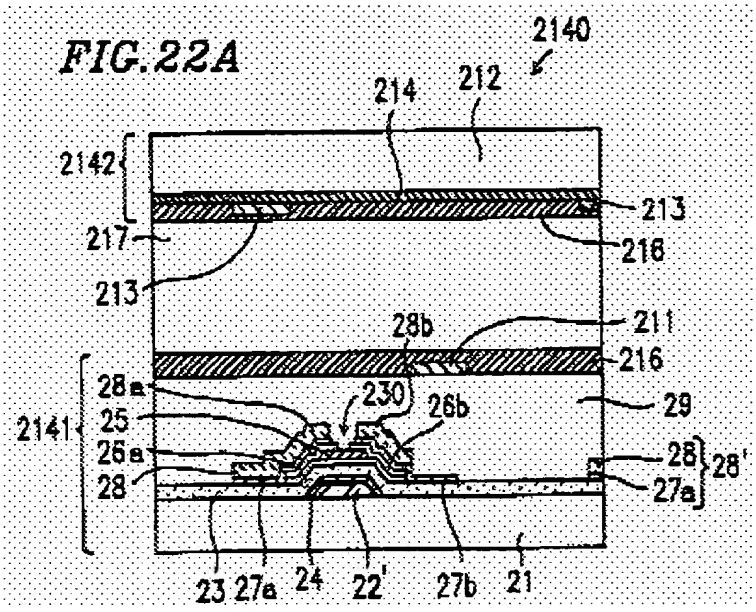
Shigeta is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use alignment layers bonded to a spacer by hydrogen bonding to strongly bond with each other, thereby realizing a liquid crystal display element having a uniform cell thickness, high shock resistance, and a desirable displaying quality.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shigeta with the alignment layer bonded to a spacer by hydrogen bonding of Shigeta to strongly bond with each other, thereby realizing a liquid crystal display element having a uniform cell thickness, high shock resistance, and a desirable displaying quality.

Second grounds of rejection:

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al (Shimada) USPAT 5,852,485 in view of Yih USPAT 3,866,313, Suzuki USPAT 6,509,948 B2, and Utsumi et al (Utsumi) USPAT 6,441,880 B1.

As to claims 15 and 16, the structural limitations in these process claims only have patentable weight when they have a non-obvious impact on the process steps, which in general, can be used to make any of a large number of LCD devices with alternate structures. Shimada discloses in Figures 21, 22A, and 22B, the process of fabricating a liquid-crystal display (LCD) device (in-plane switching-type or conventional type) which comprises; the fabrication of LCD substrate assemblies prior to filling with liquid crystal (Example 12, col. 31, line 66 through col. 36, line 6), comprising: a step of forming a first, substrate, 21, having plural electrodes that include a source line (Applicant's scanning signal line), 28', a Gate line (Applicant's image signal line), 22, a pixel electrode, 211, and an alignment layer, 216, all formed thereon, and a second substrate, 212, having a color filter, 214, a counter electrode also serving as a black matrix (Applicant's light-shielding film), 213, and an alignment layer, 216 all formed thereon.



Shimada does not explicitly disclose forming a sealant between the two substrates and around the outer peripheries of the substrates in such a manner that it partly reaches the edges of the substrates to form an opening through which liquid crystal is to be injected into the space between the sealed substrates, and a step of setting the panel in a liquid crystal-injecting unit having therein a container filled with liquid crystal, evacuating both the liquid crystal-injecting unit and the panel, putting the opening of the panel into the liquid crystal in the container, thereafter restoring the liquid crystal-injecting unit to have an atmospheric pressure in that condition so that the liquid crystal is injected into the panel through its opening owing to the inner pressure difference between the unit and the panel, and finally sealing the opening of the panel in such a condition that the panel receives no external pressure.

Yih teaches in Figures 1-6 the steps of adhesive application, evacuation, filling, sealing, etc. (Figures 1-5b, and col. 2, line 41 through col. 4 line 52) comprising forming a sealant between the two substrates (col. 3, lines 20-35) and around the outer

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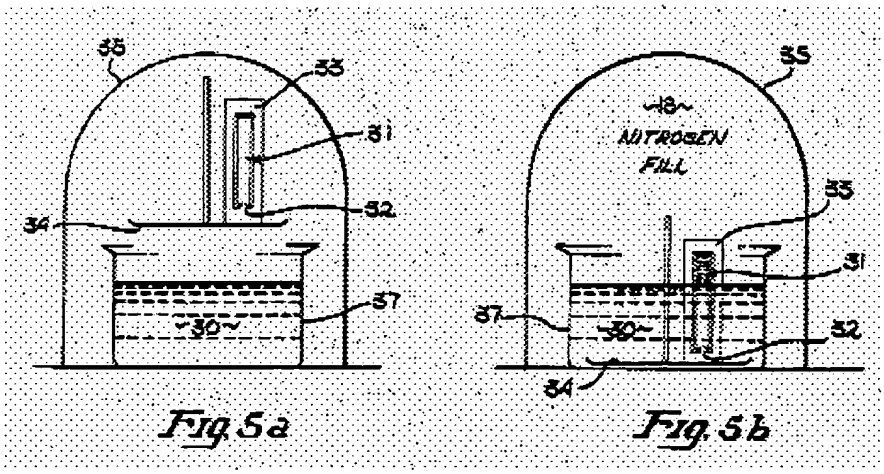


Yih teaches forcing the liquid crystal into the LCD assembly by replacing the partial vacuum with a non-reacting gas (therefore at atmospheric pressure) (col. 6, lines 1-3). Yih teaches sealing after removal from the vacuum which would result in the panel receiving no external pressure (col. 4, lines 18 and 19), and Yih teaches sealing *after*

removal of the LCD device from the liquid crystal material after filling (col. 6, lines 14-21), and that could not be accomplished without introducing a bubble (avoided by the process of Yih) if the inner pressure were any lower than atmospheric pressure, especially by as much as 0.3 kgf/cm^2.

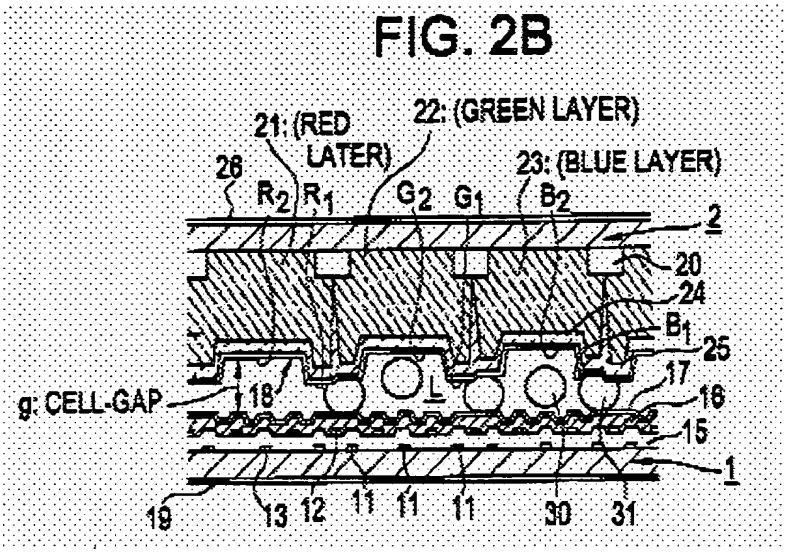
Yih is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use the adhesive application and fill techniques of Yih to complete LCD assembly with an internal pressure that is substantially equal to atmospheric pressure (within 0.3 Kgf/cm^2) to avoid bubble formation.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD fabrication process of Shimada with the sealing and filling process steps of Yih to avoid bubble formation.

Shimada does not explicitly disclose defining a gap between the first and second substrate by disposing a spacer, which is smaller than said gap, on a projecting pattern.

Suzuki teaches in Figures 2A and 2B defining a gap between the first and second substrate by disposing a spacer, 31, which is smaller than said gap, on a projecting pattern at a position corresponding to the shading membrane, 20, on one face of the second substrate where spacers, 30, remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided (Abstract).

FIG. 2B



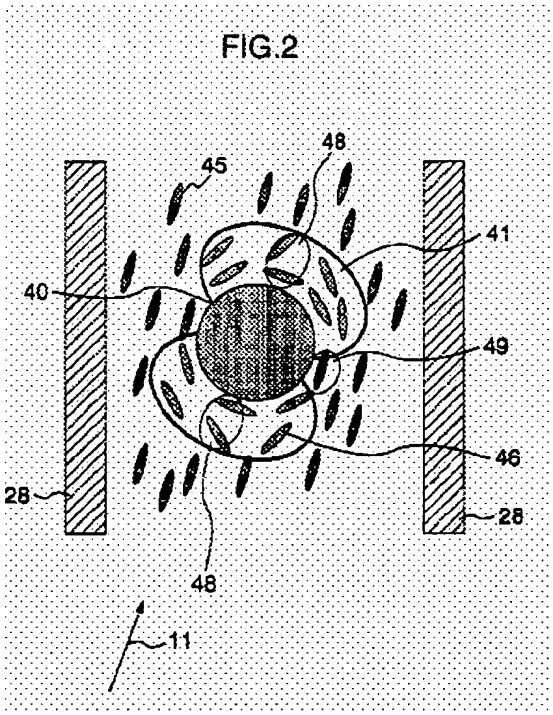
Suzuki is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to define a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada by defining a gap between the first and second substrate by disposing a spacer which is smaller than said gap, on a projecting pattern of Suzuki where spacers in the pixel regions remain uncompressed so the liquid crystal molecules will not be subject to anomalous orientation and light leakage will be avoided.

Shimada does not explicitly disclose a long-chain alkyl group (functional group) on the surface of the spacers and binging said spacer into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding.

Utsumi teaches in Figures 1, 2, and 9, the use of long-chain alkyl group coated spacers (col. 10, lines 8-11) to improve contrast and viewing angle (col. 5, lines 36-40, col. 9 and Abstract). Please note that adding the long-chain alkyl group (functional group) of Utsumi will result in spacers being brought into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding per Applicant's enabling disclosure. This is not improper hindsight; Applicant has disclosed that the result of using such spacers is all that is required to achieve such bonding.

FIG.2



Utsumi is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add the use of long-chain alkyl group coated spacers to improve contrast and viewing angle.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Shimada with the of long-chain alkyl group coated spacers of Utsumi (resulting in said spacers being brought into contact with a first or second orientation controlling membrane using van der Walls bonding or hydrogen bonding per Applicant's enabling disclosure) to improve contrast and viewing angle.

(11) Response to Argument

Exclusively to simplify issues on appeal the first grounds of rejection are withdrawn.

Regarding the second grounds of rejection:

Appellant argues Suzuki teaches away from the claimed invention because the spacers of Suzuki move freely.

It is respectfully pointed out that Appellant's argument is piecemeal. Examiner did not rely on Suzuki to teach all spacers in contact with a single substrate. Examiner applied Suzuki to teach the use of spacers smaller than a gap that establish a gap by having some of the spacers located on projecting patters.

Appellant argues that the addition of the long-chain alkyl group [Applicant's functional group] would not result in all of the spacers being disposed only on the orientation controlling membrane of either the first or the second substrate.

It is respectfully pointed out that Applicant's enabling disclosure teaches that the additions of a functional group will cause the spacers to become fixed to the orientation controlling membrane of the one substrate onto which they are scattered. Please note that the method of applying such spacers well known in the art and as taught by Suzuki is to scatter the spacers onto the surface of the orientation controlling membrane of one of the substrates prior to positioning the second substrate on top of said spacers. When the spacers have a functional group on their surface the will be "sticky" and adhere to the substrate onto which they are scattered, thereby inherently resulting in all of the spacers being disposed only on the orientation controlling membrane of either the first or the second substrate (which ever one they were scattered on).

Examiner is not aware of any known manufacturing method in the art that would result in an alternate result when adding the functional group of Utsumi to the scattered spacers smaller than the gap of Suzuki, so examiner considers the result to meet the standard for inherency.

Examiner also cites Applicant's enabling disclosure as proof that the addition of the functional group of Utsumi to the scattered spacers smaller than the gap of Suzuki is all that is needed to result in the claimed all spacers being disposed only on the orientation controlling membrane of either the first or the second substrate.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Timothy L Rude
Examiner
Art Unit 2883

tlr
June 9, 2005

Conferees

Frank G. Font

Darren E. Schuberg

Frank G. Font
Supervisory Patent Examiner
Technology Center 2800

MCDERMOTT WILL & EMERY LLP
600 13TH STREET, N.W.
WASHINGTON, DC 20005-3096